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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,975	06/29/2001	Sung-Hoe Yoon	8733.467.00	6148

30827 7590 01/18/2005

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EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 01/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/893,975	YOON, SUNG-HOE	
	Examiner	Art Unit	
	Wesley D Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed by the applicant on 11/16/2004, in which Claims 1, 3 – 5, and 7 – 9 were canceled, and Claims 10 – 16 were added. **Claims 10 – 16** are currently pending in U.S. Application Serial No. 09/893,975, and an Office Action on the merits follows.

Drawings

2. The formal drawings (3 sheets, 3 figures) filed by the applicant on 6/29/2001 are approved by the examiner.

Claim Objections

3. Claim 16 is objected to because of the following informalities: The word, "dimethylsiloxane" appears to be misspelled "dimethysiloxane". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 10 – 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding newly added independent **Claim 10** (from which **Claims 11 – 16** depend), the claim requires, in part, "curing the cholesteric liquid crystal layer so as to diffuse the additive on a surface of the cholesteric liquid crystal layer". After reviewing the applicant's specification as a whole, the examiner notes that the aforementioned limitation is not described in a manner showing that the applicant had possession of the claimed invention at the time of filing (i.e., there is no original disclosure of curing the LC layer to diffuse the additive on a surface of the layer). For example, on page 9, lines 21 – 24, of the originally filed specification, the applicant discloses that, when forming the liquid crystal layer, the additive is spontaneously disposed in the interface between the air and the liquid crystal layer. This layer, having the additive in its surface, is then plasticized / cured (page 10, lines 5 – 7). There is no disclosure regarding the curing step diffusing the additive on a surface of the LC layer.

6. Regarding **Claim 12**, the claim requires, in part, that the light reflected by the LC layer have a specific band width, "around a 540 nm wavelength peak and around a 640 nm wavelength peak". However, the originally filed specification only describes the claimed band width <u>at</u> 540 nm and 640 nm (page 10, lines 18 – 23), not <u>around</u> 540 nm and 640 nm. Therefore, Claim 12 contains subject matter that was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

7. Regarding **Claim 13**, the claim requires, in part, that the reflectivity of the LC layer range from 80% to 90%. However, the originally filed specification describes the reflectance of the LC layer as being 80% to 95% (page 10, line 24), not 80% to 90%. Therefore, the specifically claimed range of reflectivity values recited in Claim 13 was not originally disclosed by the applicant, and Claim 13 contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim Observations

8. Independent Claim 10 requires, in part, "removing the additive from the surface of the cholesteric liquid crystal layer". After reviewing the applicant's specification, the examiner notes that the only discussion relevant to "removing the additive" is on page 10, lines 8 – 9: "As time goes on, the additive 134 can disappear after completing the optical film". From this statement, it is clear that the step of "removing the additive" recited in Claim 10 does not require an active removal step designed to remove the additive (e.g., passive removal of the additive by any means is encompassed by the claimed invention). Additionally, the 35 U.S.C. 102 and 103 rejections set forth in the previous Office Action (i.e., the non-final Office Action

mailed on 8/16/2004) are withdrawn in light of the applicant's amendment to cancel Claims 1, 3 – 5, and 7 – 9.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 10, 11, and 13 – 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Greenfield et al. (USPN 6,421,107).

11. Regarding independent **Claim 10**, Greenfield et al. teaches a method of fabricating an optical film (Abstract), the method comprising (1) preparing a substrate, (2) adding an additive, specifically a surfactant (i.e., an additive having both a hydrophobic and a hydrophilic group), into a cholesteric liquid crystal material (CLC), (3) forming an alignment layer on the substrate, (4) rubbing the alignment layer, (5) applying the CLC material having the additive (surfactant) on the rubbed alignment layer to form a CLC layer, and (6) curing the CLC layer (Abstract, Col.2, lines 47 – 57, Col.4, lines 57 – 65, Col.5, lines 55 – 61, Col.19, lines 20 – 48, Col.20, lines 5 –

61, and Example 1). Greenfield et al. does not explicitly teach that the curing diffuses the additive (surfactant) on a surface of the CLC layer. However, the additive taught by Greenfield et al. is the same as the additive claimed by the applicant (i.e., the additive is a surfactant), the type of liquid crystalline material in which the additive is disposed in Greenfield et al. is the same as the liquid crystalline material claimed by the applicant (i.e., a CLC material), and the liquid crystal curing process taught by Greenfield et al. is equivalent to the applicant's claimed liquid crystal curing process. Therefore, since the processes are the same, the surfactant additive of Greenfield et al. would have inherently diffused on a surface of the CLC layer during the curing process, as claimed by the applicant. Additionally, Greenfield et al. does not explicitly teach, "removing the additive from the surface of the cholesteric liquid crystal layer". However, over a period of time, at least a portion of the surfactant would have inherently been removed from the CLC layer by, for example, (1) natural evaporation of the surfactant from the surface of the CLC layer, and/or (2) mechanical wear that occurs during the use of the optical film as, for example, a polarizer, compensator, color filter, etc., as taught by Greenfield et al. (Col.1, lines 4 – 11). Regarding **Claim 11**, Greenfield et al. also teaches that the CLC material is coated by spin coating, knife coating, bar coating, or gravure coating (Col.20, lines 30 – 33, Col.23, line 46). Regarding **Claim 13**, Greenfield et al. also teaches that the reflectivity of the CLC layer having the additive ranges from 80% to 90% (Figure 1, Col.23, lines 65 – 67, and Col.24, lines 34 – 37, which shows that the reflectivity at various wavelengths in the range of 400 to 500 nm is from 80% to

90%). Regarding **Claim 14**, Greenfield et al. also teaches curing the CLC layer with UV rays and/or heat (Col.2, lines 52 – 57, Col.20, lines 50 – 61, Col.23, lines 49 – 54). Regarding **Claim 15**, Greenfield et al. also teaches that the additive is a surfactant (Col.5, line 58, Col.19, lines 20 – 63, and Example 1).

12. Claims 10, 11, and 14 – 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Chung et al. (USPN 5,995,184).

13. Regarding independent **Claim 10**, Chung et al. teaches a method of fabricating an optical film (Abstract), the method comprising the steps of preparing a substrate (Figure 4, step "402", Col.4, lines 5 – 8, and Col.6, lines 44 – 49), adding an additive (i.e., a surfactant, which is an additive having both a hydrophilic and a hydrophobic group) to a CLC material (Abstract, Col.2, lines 49 – 52 and 58 – 67, Col.3, lines 1 – 10 and 53 – 55, Col.5, lines 15 – 32, Col.6, lines 39 – 42), forming an alignment layer on the substrate (Figure 1, reference number "104", Figure 4, step "404", Col.4, lines 8 – 16, and Col.6, lines 50 – 54), rubbing the alignment layer (Col.6, lines 54 – 61), and applying the CLC material having the additive on the rubbed alignment layer to form a CLC layer (Figure 4, step "408", Col.2, lines 58 – 64, Col.3, lines 4 – 10, Col.5, lines 1 – 50, Col.6, lines 25 – 42, and Col.7, lines 7 – 16). Chung et al. also teaches that the additive includes dimethylsiloxane, as required by **Claim 16**. Specifically, Chung et al. teaches that the additive can be a surfactant such as polydimethylsiloxane (PDMS) (Col.5, lines 31 – 32). In this case, the examiner has reasonably interpreted PDMS to be an additive that "includes dimethylsiloxane", as

claimed by the applicant. Further, Chung et al. teaches that forming the CLC layer comprises coating a liquid crystal including the additive and curing / crosslinking the liquid crystal layer on the substrate (Figure 4, steps "410" and "412", Col.3, lines 4 – 10, Col.4, lines 43 – 46, and Col.7, lines 18 – 44). Chung et al. also teaches that the additive (i.e., the surfactant) is spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer (Abstract, Col.3, lines 4 – 10, and Col.4, lines 30 – 35). Chung et al. does not explicitly teach that the curing diffuses the additive (surfactant) on a surface of the CLC layer. However, the additive taught by Chung et al. is the same as the additive claimed by the applicant (i.e., the additive is a surfactant including dimethylsiloxane), the type of liquid crystalline material in which the additive is disposed in Chung et al. is the same as the liquid crystalline material claimed by the applicant (i.e., a CLC material), and the liquid crystal curing process taught by Chung et al. is equivalent to the applicant's claimed liquid crystal curing process. Therefore, since the processes are the same, the surfactant additive of Chung et al. would have inherently diffused on a surface of the CLC layer during the curing process, as claimed by the applicant. Additionally, Chung et al. does not explicitly teach, "removing the additive from the surface of the cholesteric liquid crystal layer". However, over a period of time, at least a portion of the surfactant would have inherently been removed from the CLC layer by, for example, (1) natural evaporation of the surfactant from the surface of the CLC layer, and/or (2) mechanical wear that occurs during the use of the optical film as, for example, a compensator for an LCD, as taught by Chung et al. (Col.1,

lines 8 – 10). Regarding **Claim 11**, Chung et al. teaches that the CLC material is coated by spin coating, knife coating, bar coating, or gravure coating (Col.6, lines 25 – 29). Regarding **Claim 14**, Chung et al. also teaches that curing the CLC including the additive on the substrate uses one of UV rays or heat (Figure 4, steps "410" and "412", Col.3, lines 4 – 10, Col.4, lines 43 – 46, and Col.7, lines 18 – 44). Regarding **Claim 15**, Chung et al. also teaches that the additive is a surfactant (Col.2, lines 63 – 67, Col.3, lines 1 – 3, and Col.5, lines 15 – 33).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenfield et al.

16. Greenfield et al. teaches all the limitations of **Claims 12 and 13** as set forth above in paragraph 11, except for a method wherein light reflected by the CLC layer having the additive has a band width of 60 to 80 nm at a wavelength of 540 nm and 640 nm, and the reflectivity of the CLC layer ranges from 80% to 90%. Specifically, Greenfield et al. is silent regarding the specific band width, wavelength of reflection, and reflectivity (%) of the CLC layer. However, Greenfield et al. does teach that the

reflection characteristics of a CLC material are dependent on the pitch of the cholesteric helix (Col.1, lines 15 – 24), and the overall goal of Greenfield et al. is to control and optimize the reflectivity of the CLC layer by controlling the aforementioned helical pitch (Col.2, lines 21 – 31, Col.3, lines 52 – 61, Col.4, lines 9 – 45, and Col.5, lines 37 – 42). Therefore, it would have been obvious to one of ordinary skill in the art to control and optimize the reflectivity of the CLC layer (e.g., the band width, wavelength of reflection, and reflectivity (%)) by controlling the helical pitch of the layer (as taught by Greenfield et al.) to be any value desired by the purveyor in the art, including the values claimed by the applicant, so that the specific, desirable reflectance characteristics of the CLC film are obtained. The optimized reflectivity of the CLC film would, of course, depend on the intended use of the film (i.e., would depend on the specific wavelengths of light desired by the purveyor in the art to be transmitted and/or reflected by the CLC film).

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greenfield et al. in view of Yamada (USPN 5,667,854).

18. Greenfield et al. teaches all the limitations of **Claim 16** as set forth above in paragraph 11, except that the surfactant additive includes dimethylsiloxane. Specifically, the surfactants taught by Greenfield et al. are fluorine-based surfactants (Col.19, lines 20 – 47). Yamada teaches that, in the art of producing an optical film by depositing a liquid crystal layer containing a surfactant additive onto a rubbed alignment layer (i.e., a process analogous to that of Greenfield et al. – see

paragraph 10 above), a silicon atom-containing surfactant, such as dimethylsiloxane, is preferred over a fluorine atom-containing surfactant (i.e., a surfactant as taught by Greenfield et al.) because a small amount of silicon-containing surfactant is capable of giving a great effect (e.g., reducing non-uniform drying) when compared to a fluorine-containing surfactant (Col.8, lines 36 – 67, Col.9, and Col.10, lines 1 – 52). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a silicon atom-containing surfactant such as dimethylsiloxane, as taught by Yamada, in the liquid crystal layer of Greenfield et al. instead of a fluorine atom-containing surfactant because such a silicon atom-containing surfactant can be used in smaller amounts to give better results (e.g., a reduction in non-uniform drying) than a fluorine atom-containing surfactant.

19. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. in view of Schwalb et al. (USPN 6,057,008).

20. Chung et al. teaches all the limitations of **Claims 12 and 13** as set forth above in paragraph 13, except for a method wherein light reflected by the CLC layer having the additive has a band width of 60 to 80 nm at a wavelength of 540 nm and 640 nm, and the reflectivity of the CLC layer ranges from 80% to 90%. Specifically, Chung et al. is silent regarding the specific band width, wavelength of reflection, and reflectivity (%) of the CLC layer. However, Schwalb et al. teaches that the reflection characteristics of a CLC material are dependent on factors such as the pitch of the cholesteric helix, the refractive index of the material, and the birefringence of the

material (Col.1, lines 15 – 67). Therefore, it would have been obvious to one of ordinary skill in the art to control and optimize the reflectivity of the CLC layer (e.g., the band width, wavelength of reflection, and reflectivity (%)) of Chung et al. by controlling the helical pitch of the layer, the refractive index of the material, and the birefringence of the material (as taught by Schwalb et al.) to be any value desired by the purveyor in the art, including the values claimed by the applicant, so that a specific, desirable reflectance characteristic of the CLC film is obtained. The optimized reflectivity of the CLC film would, of course, depend on the intended use of the film (i.e., would depend on the specific wavelengths of light desired by the purveyor in the art to be transmitted and/or reflected by the CLC film in the cholesteric compensator of Chung et al.).

21. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. in view of Yamada.

22. Specifically, if the applicant intends to exclude PDMS from **Claim 16** by reciting that the additive includes dimethylsiloxane (i.e., not polydimethylsiloxane), Chung et al. teaches all the limitations of **Claim 16** as set forth above in paragraph 13, except for a method wherein the additive (i.e., a surfactant having both a hydrophobic group and a hydrophilic group) includes dimethylsiloxane. However, Chung et al. does teach that the additive can be a non-reactive surfactant in general, and the specific surfactant utilized does not appear to be limited (Col.5, lines 15 – 32). An example of the classes of surfactants taught by Chung et al. is a non-reactive silicon oil

surfactant (Col.5, line 22). Yamada teaches a similar method of forming an optical sheet in which a surfactant is included in the LC layer / composition (Abstract and Col.4, lines 22 – 28). Further, Yamada teaches that dimethylsiloxane can be utilized as the surfactant (Col.9, lines 35 – 42) and that the inclined angle of the LC compound on a surface side (air side) can be controlled by selecting the compound(s), such as the surfactant, employed together with the LC compound (Col.16, lines 49 – 57). Therefore, it would have been obvious to one of ordinary skill in the art to utilize dimethylsiloxane (as taught by Yamada) as the surfactant in the process of Chung et al. with the reasonable expectation of successfully and advantageously choosing and utilizing a specific, well-known surfactant (i.e., dimethylsiloxane) out of the broader genus of surfactants taught generally by Chung et al. One of ordinary skill in the art would have done so with the expectation that the objectives of Chung et al. (i.e., producing an optical compensator for improving the viewing angle and contrast of LCDs) would have been met, regardless of the exact surfactant utilized. Yamada also teaches that, in the art of producing an optical film by depositing a liquid crystal layer containing a surfactant additive onto a rubbed alignment layer, a silicon atom-containing surfactant, such as dimethylsiloxane, is preferred over a fluorine atom-containing surfactant because a small amount of silicon-containing surfactant is capable of giving a great effect (e.g., reducing non-uniform drying) when compared to a fluorine-containing surfactant (Col.8, lines 36 – 67, Col.9, and Col.10, lines 1 – 52). This is yet another reason to utilize

dimethylsiloxane (i.e., a silicon-containing surfactant) as the surfactant in the process of Chung et al.

Response to Arguments

23. Applicant's arguments filed on 11/16/2004 have been fully considered but they are not persuasive. Specifically, the applicant's arguments are moot in view of the new grounds of rejection presented above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
Art Unit 1762

WDM

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